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PLANETARY PHENOMENA FOR MAY AND JUNE, 1906.

BY MALCOLM MCNEILL.

PHASES OF THE MOON, PACIFIC TIME.

First Quarter, May 1, 11h 7m A. M.	Full Moon, June 6, 1h 12m P. M.
Full Moon, " 8, 6 10 A. M.	Last Quarter, " 13, 11 34 A. M.
Last Quarter, " 14, 11 3 P. M.	New Moon " 21, 3 6 P. M.
New Moon, " 22, 12 1 A. M.	First Quarter, " 29, 6 19 A. M.
First Quarter, " 30, 10 24 P. M.	

The Sun reaches the summer solstice and summer begins about midnight June 21st, Pacific time.

Mercury is a morning star on May 1st, rising somewhat less than an hour before sunrise. It reaches greatest west elongation on May 2d, and during the first half of the month the interval between the rising of the planet and of the Sun remains a little less than one hour. The conditions for visibility are not good, but the planet may possibly be seen in the morning twilight if the weather conditions are especially favorable. This greatest elongation ($26^{\circ} 46'$) is much larger than the average, since it comes about a week after perihelion; but the planet's distance south of the Sun makes the interval between the rising of the planet and the Sun rather small. *Mercury* reaches superior conjunction and becomes an evening star on June 8th. It then moves away from the Sun, and shortly after the middle of the month sets rather more than an hour after sunset. This interval increases to about an hour and a half by the end of the month; and the planet can then be easily seen in the evening twilight, although it will not reach its greatest east elongation until nearly the middle of July.

Venus is also an evening star and remains above the horizon on May 1st a little more than an hour and a half after sunset. At the end of June this interval has increased to a little more than two hours. The planet increases its distance from the Sun about 15° during this period, but it is moving along a part of the ecliptic somewhat south of the Sun's position. It moves from *Taurus* through *Gemini* and *Cancer* into *Leo*. At the beginning of May *Venus*, *Mars*, and *Jupiter* are all near together in *Taurus*, *Venus* being the farthest west.

Its more rapid eastward motion causes it to overtake and pass *Mars* on the morning of May 6th. At the time of nearest approach the planets are only 5' apart, a distance less than twice the minimum separable by the naked eye. Unfortunately this very close approach occurs while the planets are below our horizon, but may be seen in the eastern hemisphere. *Venus* overtakes and passes *Jupiter* on the evening of May 11th. The minimum distance is a little more than 1°, about two diameters of the Moon, and occurs at a time when the planets are above our horizon. Then on the morning of May 18th *Mars* overtakes and passes *Jupiter*, the least distance being about the same as that at the conjunction of *Venus* and *Mars*.

Mars is still visible in the evening sky, but the Sun is drawing nearer to it. On May 1st it sets about two hours after the Sun; on June 1st, about an hour, and on July 1st, less than half an hour. The planet has now reached nearly its minimum of brightness, about that of the Pole Star, and it will not be easy to see it in the evening sky after June 1st. It will reach conjunction with the Sun about the middle of July, becoming a morning star, but will not be at all conspicuous for several months.

Jupiter during the early part of the May-June period is still conspicuous in the evening twilight. On May 1st it does not set until after 9 o'clock, but by June 1st, it remains above the horizon only about half an hour after sunset. It may be possible to see the planet on that date owing to its great brightness, but it soon draws too near the Sun for naked-eye view. It passes conjunction with the Sun on the morning of June 10th and becomes a morning star. By the end of June it rises about an hour before sunrise, and may be easily seen as a morning star. Between May 1st and June 30th it moves about 15° eastward in the constellation *Taurus*.

Saturn rises at about 3 A. M. on May 1st, and at about 11 P. M. on June 30th. It is therefore in fair position for early-morning observation. It is in the eastern part of the constellation *Aquarius* and moves about 3° eastward and northward, with constantly diminishing motion, until June 27th. It then ceases its eastward motion and begins to move westward. During the first half of the year the Earth has been continually

drawing nearer the plane of the rings, and the apparent minor axis is in June, only about one eighteenth of the major. The motion of the Earth during the latter half of the year will cause a slight increase in the apparent minor axis, but the Earth will pass the plane of the rings in 1907, and the apparent ellipse will reduce to a mere line.

Uranus rises before midnight on May 1st and shortly after 7 P. M. on June 30th. It retrogrades (moves westward) about 2° in the constellation *Sagittarius* during this period, and is a few degrees north of the "milk-dipper." No bright star is very near.

Neptune is in *Gemini*, and is in the western sky in the evening. It will reach conjunction with the Sun on July 2d.
